Columbia Spotted Frog (*Rana luteiventris*)

Species Status Statement.

Distribution

The range of Columbia spotted frog encompasses Southeastern Alaska at its northernmost point and extends south through Western Alberta, Washington, Montana, Oregon, Idaho, Wyoming, and into portions of Nevada and Utah where the species distribution is more patchy. The exact historical distribution of spotted frog within Utah is not well known (Bailey et al. 2006). Based on anecdotal information, museum collections and surveys conducted in the mid 1900's, a wide distribution along the Wasatch Front seems likely (Tanner 1931, Toone 1991). Ross et al. 1993 surveyed historical and potentially suitable Columbia spotted frog habitat, and concluded that the distribution of the species along the Wasatch Front had declined. In contrast, surveys in the Ibapah, Tule, and Snake Valleys, which are located in Utah's West Desert, suggested a distribution that has remained stable (Ross et al. 1994).

Table 1. Utah counties currently occupied by this species.

Columbia Spotted Frog	
DAVIS	SUMMIT
JUAB	TOOELE
MILLARD	UTAH
SALT LAKE	WASATCH
SANPETE	WEBER

Abundance and Trends

Along the Wasatch Front, both the amount of available habitat, and the abundance of Columbia spotted frogs in currently occupied habitat, have declined. In Utah's West Desert, the populations in the Ibapah, Snake and Tule Valleys have remained stable.

Statement of Habitat Needs and Threats to the Species.

Habitat Needs

Columbia spotted frog habitat needs vary by life stage and time of year. Unshaded shallow areas containing submerged vegetation are preferred areas for egg deposition in the spring (Pearl et al. 2007). These habitats also serve as nursery areas for developing eggs and larvae. Stable hydrology is important at this time of the year to prevent desiccation of eggs and larvae. Adult Columbia spotted frogs prefer aquatic habitats that do not shrink in size seasonally, have constant seasonal water temperatures, and contain emergent vegetation (Welch and

MacMahon 2005). During winter, these frogs select pond areas with the highest water temperatures and the highest dissolved oxygen concentrations (Bull and Hayes 2002).

Threats to the Species

The primary threats to Columbia spotted frog include infection with the *Batrachochytrium dendrobatidis* species of chytrid fungus (i.e. Chytridiomycosis), predation from and competition with nonnative species, the most detrimental of which is the American Bullfrog (*Rana Catesbeiana*), and habitat loss and fragmentation via human induced dewatering. All three of these threats are present along the Wasatch Front where populations have declined. In contrast, these threats are minimal or are absent in the West Desert, which has likely been a contributing factor to the stability of populations of Columbia Spotted Frog in this area.

Table 2. Summary of a statewide-scale threat assessment and prioritization completed in 2013 (Utah WAP 2015; Salafsky et al. 2008). Note that these threat rankings do not apply at the scale of local populations; a threat ranked medium at the overall, statewide level may be the most important threat to a local population. The threat assessment provides more information not presented here, including lower ranked threats, crucial data gaps, and definitions for all the threats and data gaps.

Columbia Spotted Frog
Very High
Droughts
Medium
Groundwater Pumping
Housing and Urban Areas
Invasive Wildlife Species - Non-native

Rationale for Designation.

Several factors warrant maintaining Columbia spotted frog designation as a state sensitive species.

- The species no longer occurs in much of its historic range, particularly along the Wasatch Front, which given the hydrology of the region was probably the core of the global population.
- A number of threats that are difficult to manage or mitigate confront remaining populations. Some of these populations continue to decline, while others appear to be secure, given ongoing management.
- Creating new populations is still beyond our ability therefore remaining populations require protection. Efforts to establish refuge populations for this species have thus far been unsuccessful, with the exception of translocations within specific populations.

Economic Impacts of Sensitive Species Designation.

Table 3. Brief description of the threat as it presents to all wildlife and habitats statewide. Includes some discussion of sources, potential ways to engage those sources to manage the threat, and some risks and opportunities of engagement.

Threat (all taxa)	**Economic & Social Assessment**
Droughts	This threat leads to loss of surface water sources and increased depletion of groundwater sources. It is a multiplier of threats such as agricultural water use, and a driver of threats such as increased stream temperatures. Water managers and water rights owners can balance their legal rights to use water, and their legal obligations to supply water, with opportunities for avoiding, minimizing, or compensating for impacts to wildlife. Consultation, planning, incentives and partnerships exist to help prepare for droughts and to respond to them. Potential economic and social impacts of managing this threat range from minimal to immense, and require very careful consideration. However, the economic and social impacts of failing to manage this threat are also very high. Actions taken to mitigate this threat have very high potential to prevent or reverse Endangered Species Act listings.
Groundwater Pumping	Impacts of this threat to wildlife and habitats include lowering of aquifers, reduction or loss of rivers, streams, springs, riparian habitat, and wetlands. Well owners and groundwater managers can balance their legal rights and obligations, with opportunities for improving groundwater management for wildlife. Existing licensing, permitting, and enforcement processes exist to manage this threat within individual states, but monitoring and enforcement may not be adequate. Interstate use of groundwater is particularly difficult to address under existing legal structures, and Utah is suffering presently from intensified withdrawal in adjacent states. Depending on the groundwater basin, potential economic impacts range from minimal to substantial, and would require careful consideration and possible interstate compacts, which are notoriously challenging to develop as well as to enforce. Positive and negative social effects would be moderate to severe, across groundwater basins. Actions taken to mitigate this threat have high potential to prevent or reverse Endangered Species Act listings, but would be remarkably difficult to pull off across adjoining state jurisdictions.

Housing and Urban Areas	This threat encompasses forms of development ranging from dispersed cabin communities to major cities. Some habitat is directly lost from the development footprint and associated infrastructure. More habitat is impacted over time by the increased requirements for fresh water, wastewater treatment, energy, fire exclusion, etc. Planning, zoning, and best management practices exist to manage this threat. Consultation is available to help avoid, minimize, or mitigate further impacts. Economic impacts to manage this threat range from moderate to immense, and would require careful consideration. Positive social effects would likely be dispersed and substantial, while negative ones would likely be localized and intense. Actions taken to mitigate this threat have limited potential to prevent or reverse Endangered Species Act listings.
Invasive Wildlife Species - Non-native	This threat to native wildlife mainly concerns invasive aquatic vertebrates and invertebrates, and their effects on native species and habitats. Preventing new arrivals, and the spread of existing populations, is essential. Confining or reducing existing populations is often a major challenge. Prevention is the best and cheapest strategy, treatment is expensive and difficult. Economic impacts of invasive wildlife species can be enormous. Social effects can also be very large, as invasive species are to a significant extent a social problem. Education can help change people's behavior; regulation has a role but alone it is insufficient. Actions taken to prevent, reverse, or mitigate this threat have very high potential to prevent or reverse Endangered Species Act listings.

Literature Cited.

Bailey, C.L., K.W. Wilson, and M.E. Anderson. 2006. Conservation agreement and strategy for Columbia spotted frog (Rana luteiventris) in the State of Utah. Utah Division of Wildlife Resources, Publication Number 06-01, Salt Lake City, Utah, USA.

Bull, E.L. and M.P. Hayes. 2002. Overwintering of Columbia Spotted Frogs in Northeastern Oregon. Northland Science 76:141-147.

Pearl, C.A., M.J. Adams, and W.H. Wente. 2007. Characteristics of Columbia Spotted Frog (*Rana luteiventris*) oviposition sites in Northeastern Oregon, USA. Western North American Naturalist 67(1):86-91.

Ross, D.A., D.L. Shirley, P.A. White, and L.D. Lentsch. 1993. Distribution of the spotted frog along the Wasatch Front in Utah. Utah Division of Wildlife Resources Publication Number 93-4. 24 pp.

Ross, D.A., M.C. Stanger, K. McDonald, D.L. Shirley, P.A. White, and L.D. Lentsch. 1994. Distribution, habitat use and relative abundance indices of spotted frogs in the West Desert, Utah, 1993. Utah Division of Wildlife Resources Publication Number 93-15. 29 pp.

Salafsky, N., D. Salzer, A.J. Stattersfield, C. Hilton-Taylor, R. Neugarten, S.H.M. Butchart, B. Collen, N. Cox, L.L. Master, S. O'Connor, and D. Wilkie. 2008. A standard lexicon for

biodiversity conservation: unified classifications of threats and actions. Conservation Biology 22: 897–911.

Tanner, V.M. 1931. A syntopical study of Utah Amphibia. Utah Academy of Science 8:159-198.

Toone, R.A. 1991. General inventory for western spotted frogs (*Rana pretiosa*) in the House Range Resource Area, Utah. Utah Natural Heritage Program. 10pp.

Utah Division of Wildlife Resources. 2015. Utah Wildlife Action Plan: A plan for managing native wildlife species and their habitats to help prevent listings under the Endangered Species Act 2015-2025. Publication Number 15-14, 385 pp.

Welch, N.E. and J.A. MacMahon. 2005. Identifying habitat variables important to rare Columbia Spotted Frog in Utah (U.S.A.): an information-theoretic approach. Conservation Biology 19(2):473-481.